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A PRELIMINARY NOTE ON A NEW BARK DISEASE OF THE WHITE PINE

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(WITH PLATE 120, CONTAINING 2 FIGURES)

In the spring of 1911, Mr. Herman de Fremery, a student at the Yale Forest School, called the attention of the writer to a disease which appeared to be killing the young white pines in a plantation at the Maltby Lakes, near New Haven, Connecticut.

Soon after this, a trip was made to the region in question. The stand consisted of *Pinus Strobus,* from 5 to 7 feet in height, planted 6 feet apart each way, and just about to commence the ninth year of growth. In one spot, several trees were seen to be entirely dead, forming a blank of considerable area, on the margin of which others were found to be in various stages of the disease.

In cases where the disease had not progressed far, the most apparent outward sign of the trouble was a slight yellowish cast of the foliage, which, from its strong contrast to the normal bluish-green of the healthy trees, could be readily detected from a considerable distance. To all outward appearances, the trunk was sound, but a careful examination showed that the extreme basal portion, which was often more or less covered with old dead leaves and needles, was somewhat sunken and covered with the minute black pustules of some fungus. The bark here was entirely dead, and often at this point the trees were entirely girdled, the lesions extending sometimes 3 or 4 inches from the ground (Plate 120, fig. 2).

At the time, as an effort to determine whether the fungus was a true parasite, four inoculations were made in healthy trees. For this purpose, pieces of bark from the lesions on diseased trees were transferred to corresponding positions at the base of healthy trees where areas of healthy bark of similar size had been cut out. The edges of the patch of diseased bark thus inserted were covered with grafting wax to prevent drying out and contamination.

As far as can be ascertained, these inoculations were unsuccessful, for at the present date, *i. e.*, after the lapse of nearly three years, in three cases the wounds have healed at their edges. Unfortunately, the fourth tree has been lost sight of, but it is of course possible that it was one of the dead trees which have recently been removed from the blank. Since the inoculations were made in the spring of the year, the season may have been unfavorable for the invasion of the fungus, for at this period of its most rapid growth the pine has naturally its greatest capacity for wound healing.

At the present time, the blank caused by the disease in the above mentioned locality is more or less circular, and about 30 feet in diameter. Thirty-one trees have died, and 7 more, here and there around the edge of the area, are dying, each one with the characteristic canker at its base (Plate 120, fig. 1). Of the dead trees, the youngest show eight years' growth, proving that they died in 1910. The disease may therefore have been present at least two or three years before this.

Recently, Professors Toumey and Hawley, of the Yale Forest School, have again directed the writer's attention to the disease. Professor Toumey states that he has recently observed it near Conway Lake, Conway Center, New Hampshire. Here, among wild white pines, he saw several diseased patches, in one or two instances a rod or more in diameter. The trees were all the way from 1 to 10 feet in height, and showed the characteristic constrictions at the base of the stem. Professor Hawley has also noticed the trouble in various plantations in Connecticut. Dr. W. E. Britton, of the Connecticut Agricultural Experiment Station, says that he has seen it, or something very similar, on a plantation near Middletown, Conn. We understand that the same disease has also been reported as occurring in the State of New York.

Dr. G. P. Clinton,[1] in his report of Connecticut plant diseases for 1911–12, notes a trouble which is evidently the same. Speaking of it as a "stem canker," he states that some of the specimens have the aspect of being attacked by a parasitic fungus. He has found a *Phoma* fruiting on the dead area, and thinks that the trouble may be due to this.

[1] Clinton, G. P. Rept. Conn. Agr. Exp. Sta. **1912**: 354. *pl. 19a.* 1913.

On account of these various reports and inquiries concerning the disease, the writer has recently taken up its study in detail, one of the principal objects being to determine whether, as Clinton suggests may be the case, it is a trouble following winter or drought injury, or whether it is caused by a parasitic fungus, Connecticut plantations at East Haven, Mt. Carmel, and West Hartford have already been visited, and the disease, with all the symptoms as described above, has been found to be present at these places. Moreover, in all the plantations, blanks like the one described and figured here have been found, and these are being steadily enlarged by the death of trees around their borders.

In 1911, a fungus was isolated from the bark of the dying trees which was believed to be a species of *Fusicoccum*. The work was not followed up, however, and no inoculations with the pure cultures were made. In our recent work, nine fungi have been isolated from the bark of dying trees and several more from the bark of dead trees. Nevertheless, of these nine, the same species of *Fusicoccum* found earlier is of the most general occurrence. The bark of many trees is infested by this species alone, and it is also of importance to note that its fruiting bodies may be found in close proximity to the boundary between healthy and diseased bark. The plurilocular pycnidia, borne in a stroma, contain vast numbers of hyaline, cylindrical spores, usually with one end acute and the other blunt, and averaging 12 × 2 μ.

The disease resembles the "Einschnürungskrankheit" of the fir, described by Hartig[2] as killing branches of the host, and caused by *Phoma abietina* Hartig, which later became known as *Fusicoccum abietinum* (Hartig) Prill. and Delacr.[3] The spores of this, however, seem to differ in shape somewhat from those of our form.

Pure cultures have been made of all the fungi found on the dying trees, and inoculations with these species on healthy trees in the greenhouse are now in progress. The results of these, together with a more detailed account of the disease, will be published later.

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[2] Hartig, Robert. Lehrbuch der Baumkrankheiten, ed. 2. p. 124. 1889.

[3] Prillieux, E., and Delacroix, G. Travaux du Laboratoire de Pathologie végétale, Bull. Soc. Myc. Fr. 6: 176. 1890.

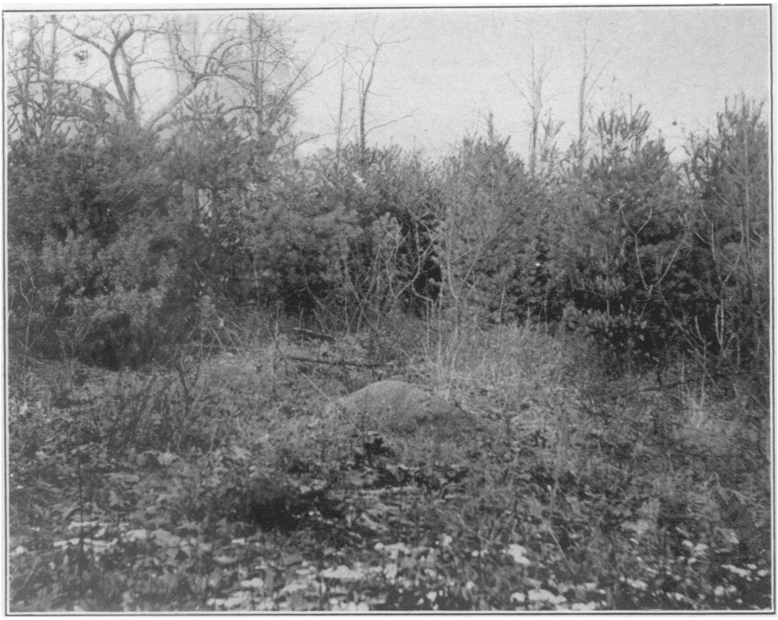

FIG. 1. PLANTATION OF WHITE PINE AFFECTED BY THE DISEASE

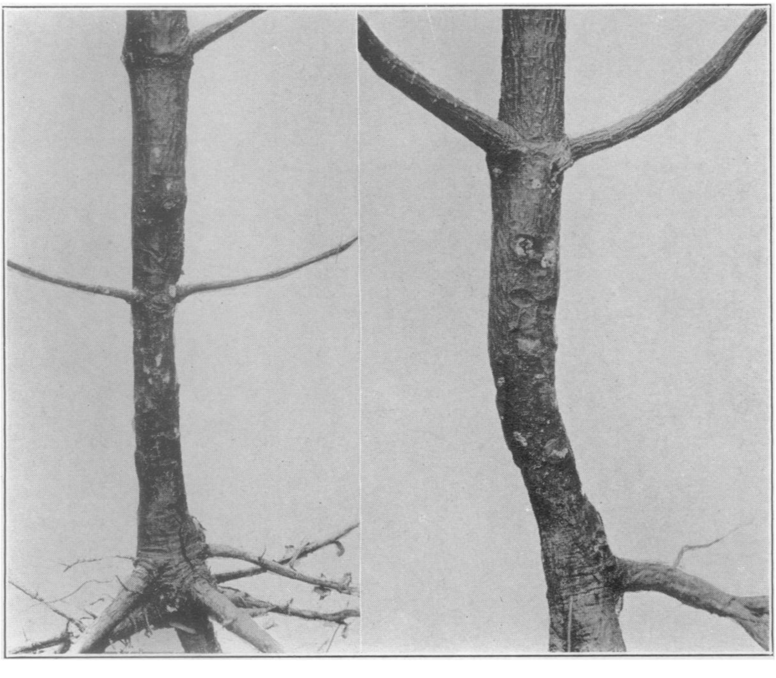

FIG. 2. YOUNG PINE TREES ATTACKED BY THE DISEASE

We take this opportunity, however, to warn owners of white pine plantations to be on the watch for this trouble. Since it is quite probable that it is of a parasitic nature, it is advisable to remove all diseased trees and burn them, or at least the parts of the stem that are affected with the disease, in order to prevent its further spread.

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EXPLANATION OF PLATE CXX

Fig. 1. Photograph showing open area caused by the death of trees from the bark disease in a plantation of *Pinus Strobus* at Maltby Lakes, near New Haven, Conn. At the left, a dying tree, with yellowing leaves, and those of the latest growth much shortened: two trees entirely dead in the foreground at the right.

Fig. 2. Photograph of canker at base of stem of 7 year old *Pinus Strobus*. × 2/5.